Climate4you update January 2010

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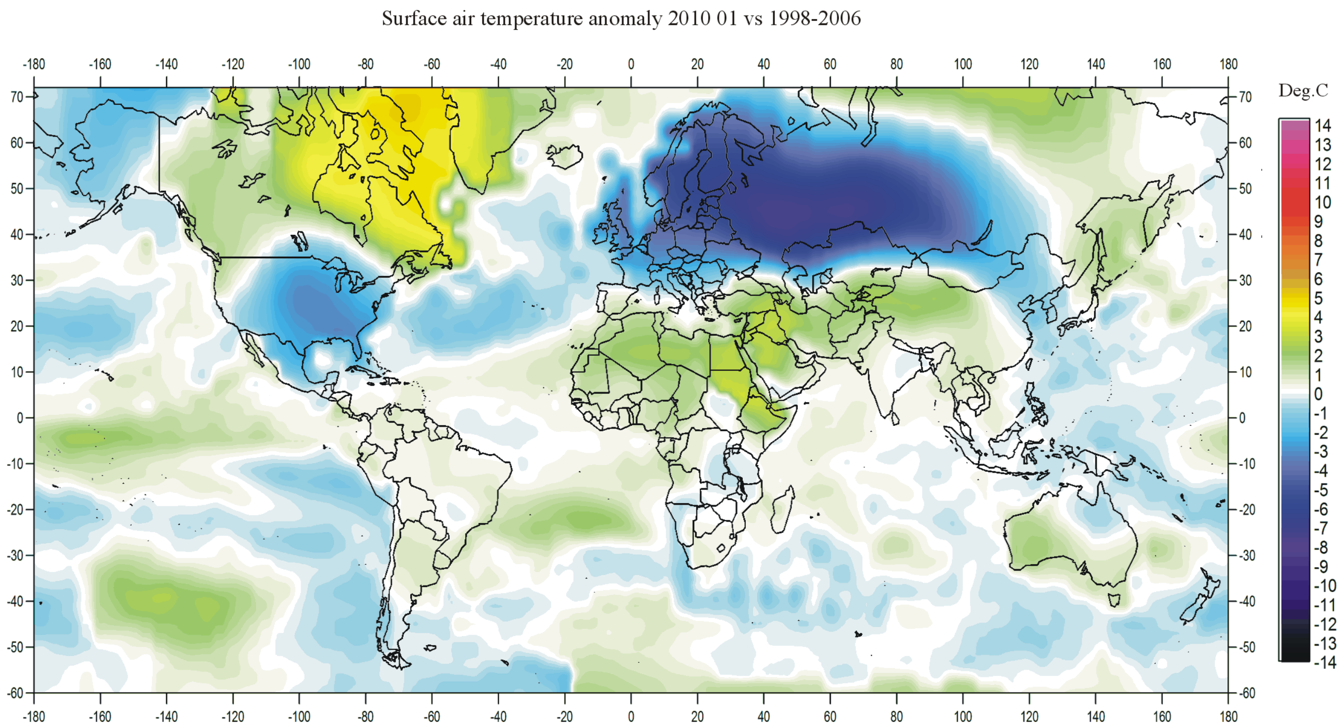
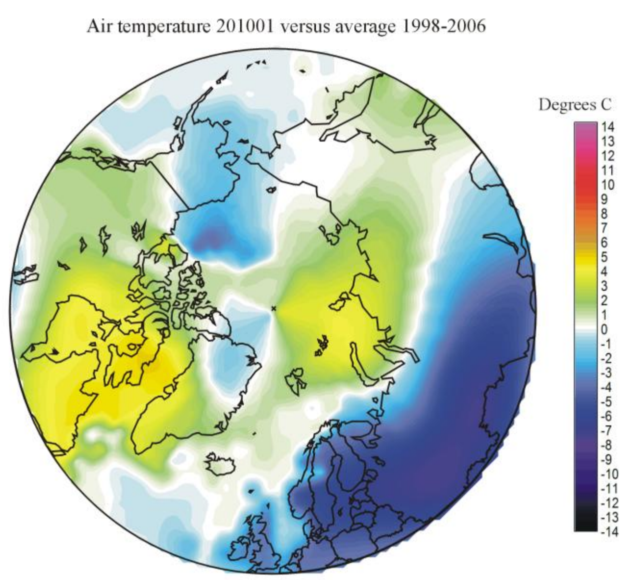
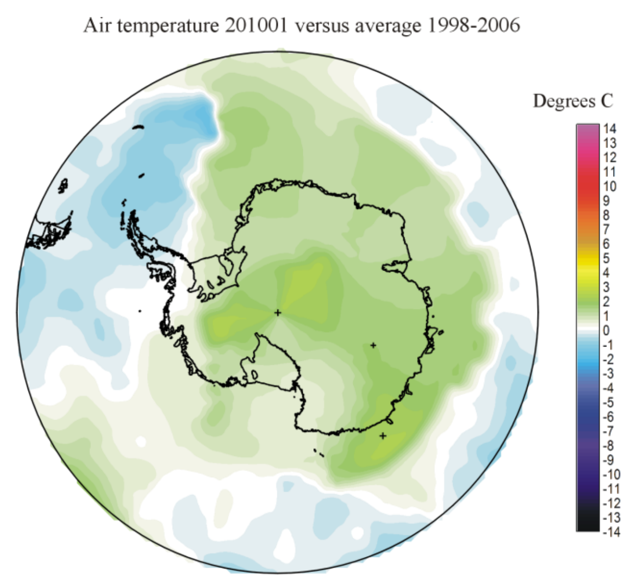
January 2010 global surface air temperature overview







January 2010 surface air temperature compared to the average for January 1998-2006. Green.yellow-red colours indicate areas with higher temperature than the 1998-2006 average, while blue colours indicate lower than average temperatures. Data source: Goddard Institute for Space Studies (GISS)

Comments to the January 2010 global surface air temperature overview

This newsletter contains graphs showing a selection of key meteorological variables for January 2010. All temperatures are given in degrees Celsius.

In the above maps showing the geographical pattern of surface air temperatures, the period 1998-2006 is used as reference period. The reason for comparing with this recent period instead of the official WMO 'normal' period 1961-1990, is that the latter period is affected by the relatively cold period 1945-1980. Almost any comparison with such a low average value will therefore appear as high or warm, and it will be difficult to decide if modern surface air temperatures are increasing or decreasing. Comparing with a more recent period overcomes this problem.

In addition to the above consideration, the recent temperature development may suggest the time window 1998-2006 to roughly represent a global temperature peak. If so, negative temperature anomalies will gradually become more and more widespread as time goes on. However, if positive anomalies instead gradually become more widespread, the reference period only represented a temperature plateau.

In the other diagrams in this newsletter the thin line represents the monthly global average value, and the thick line indicate a simple running average, in most cases a 37-month average, almost corresponding to three years.

The year 1979 has been chosen as starting point in several of the diagrams, as this roughly corresponds to both the beginning of satellite observations and the onset of the late 20th century warming period.

HadCRUT3 data from CRU (Climate Research Unit, UK) are not updated to January 2010 at the moment.

Global surface air temperatures January 2010 was characterised by varied conditions in the Northern Hemisphere, ranging from very cold to very warm conditions, while the Southern Hemisphere showed less regional variation.

In the Northern Hemisphere extensive, cold areas covered Europe, Russia and western Siberia, and Mexico, USA and Alaska. On the other hand, eastern Siberia, most of Canada and Greenland experienced high temperatures. As was the case for December 2009, this situation was controlled by a strong Russian-Siberian High Pressure, extending across parts of Europe. By this, Russia and Europe were more or less continuously exposed to cold air masses from the east, while the European Arctic (incl. Svalbard), Greenland and especially NE Canada, along with eastern Siberia were exposed to the influence of warm air masses advecting from the south.

Conditions near Equator were influenced by the ongoing El Niño in the Pacific Ocean. Also in January the atmospheric warming derived from this was partly offset by relatively cold conditions in the western Pacific. At the same time, however, relatively warm conditions extended from the Equatorial Atlantic and northern Africa all the way into western China. As all these regions all are located near the Equator, their surface area is immense, and the effect on the global average surface temperature therefore equally large.

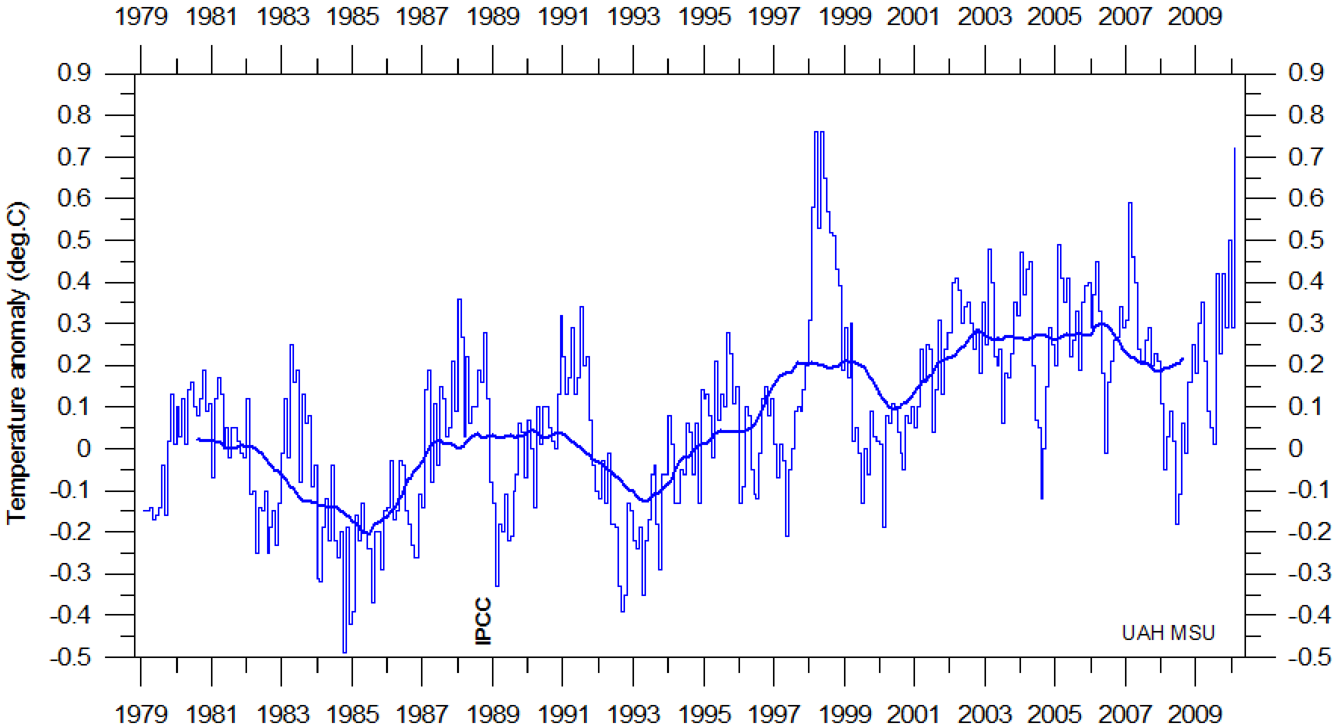
In the Southern Hemisphere most land areas experienced temperature conditions near the 1998-2006 average.

In the Arctic, Alaska and the European sector in general was relatively cold, while most of Siberia, Canada and Greenland experienced relatively high temperatures. As mentioned above, this temperature pattern is at least partly explained by the strong high air pressure over Russia and Siberia.

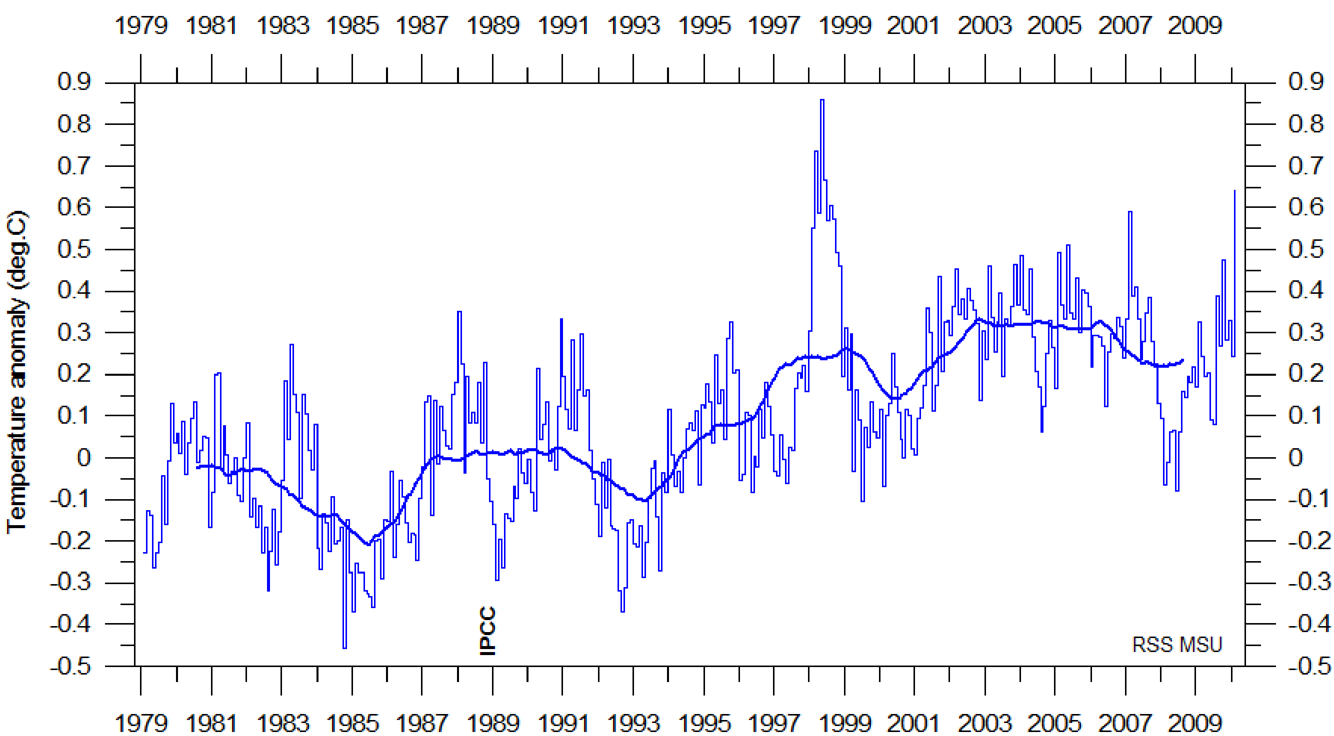
In the Antarctic, conditions were generally relatively warm, however, with the Antarctic Peninsula being relatively cold.

All diagrams and figures are available for download on http://www.climate4you.com/

Lower troposphere temperature from satellites, updated to January 2010

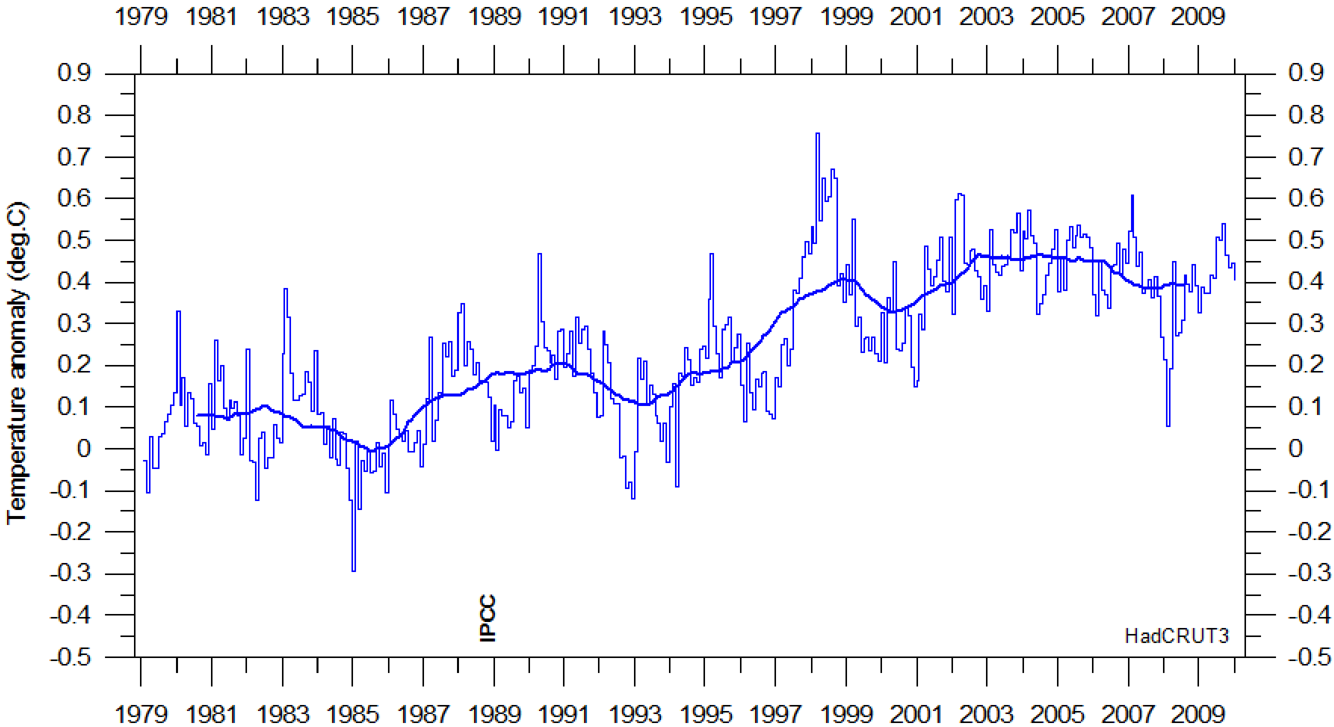


Global monthly average lower troposphere temperature (thin line) since 1979 according to [University of Alabama](#) at Huntsville, USA. The thick line is the simple running 37 month average.

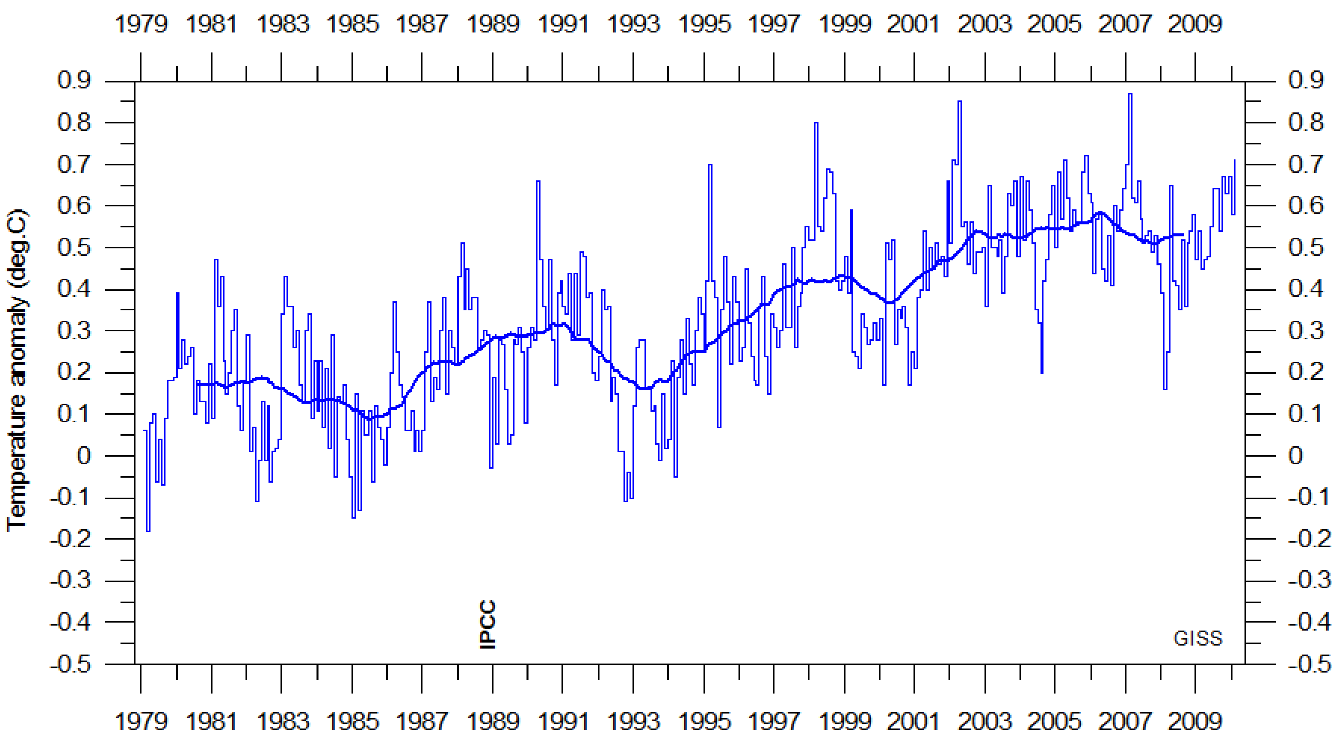


Global monthly average lower troposphere temperature (thin line) since 1979 according to according to [Remote Sensing Systems](#) (RSS), USA. The thick line is the simple running 37 month average.

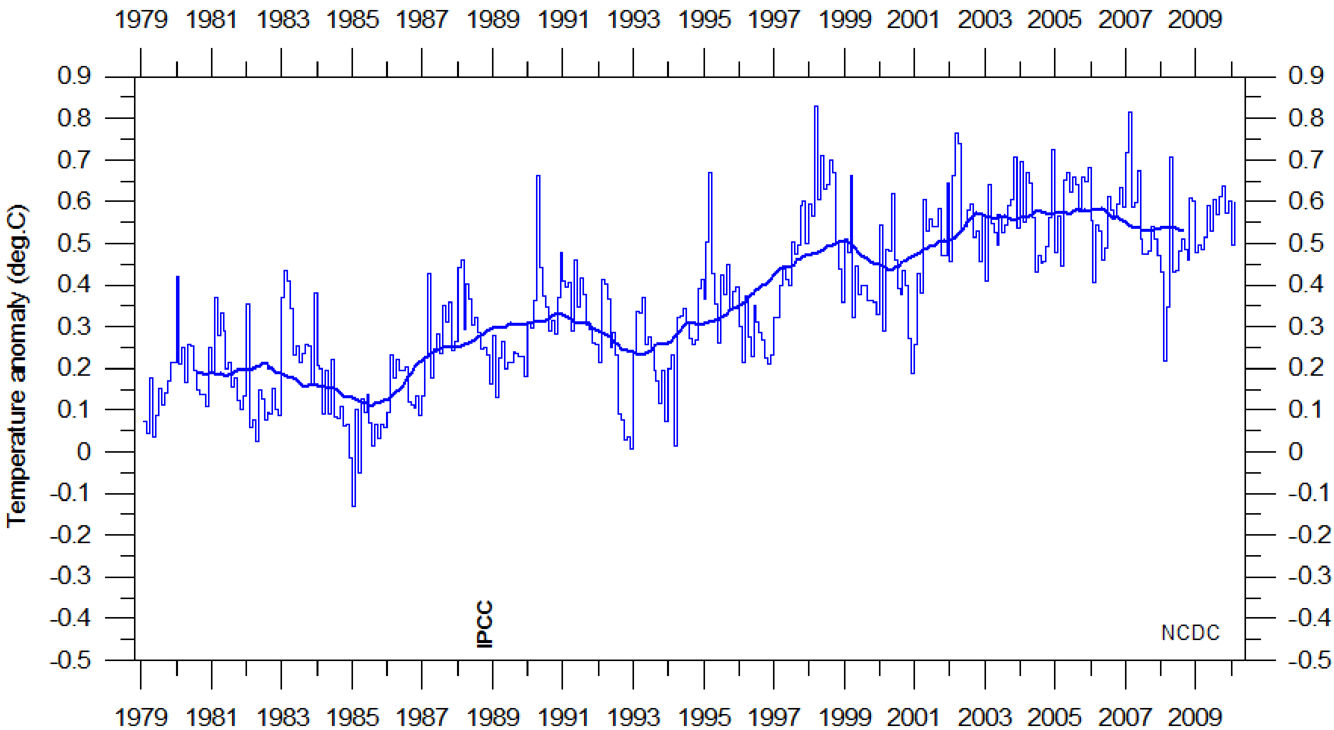
Global surface air temperature, updated to January 2010



Global monthly average surface air temperature (thin line) since 1979 according to according to the Hadley Centre for Climate Prediction and Research and the University of East Anglia's [Climatic Research Unit](#) ([CRU](#)), UK. The thick line is the simple running 37 month average. Please note that this data series has not been updated beyond December 2009.



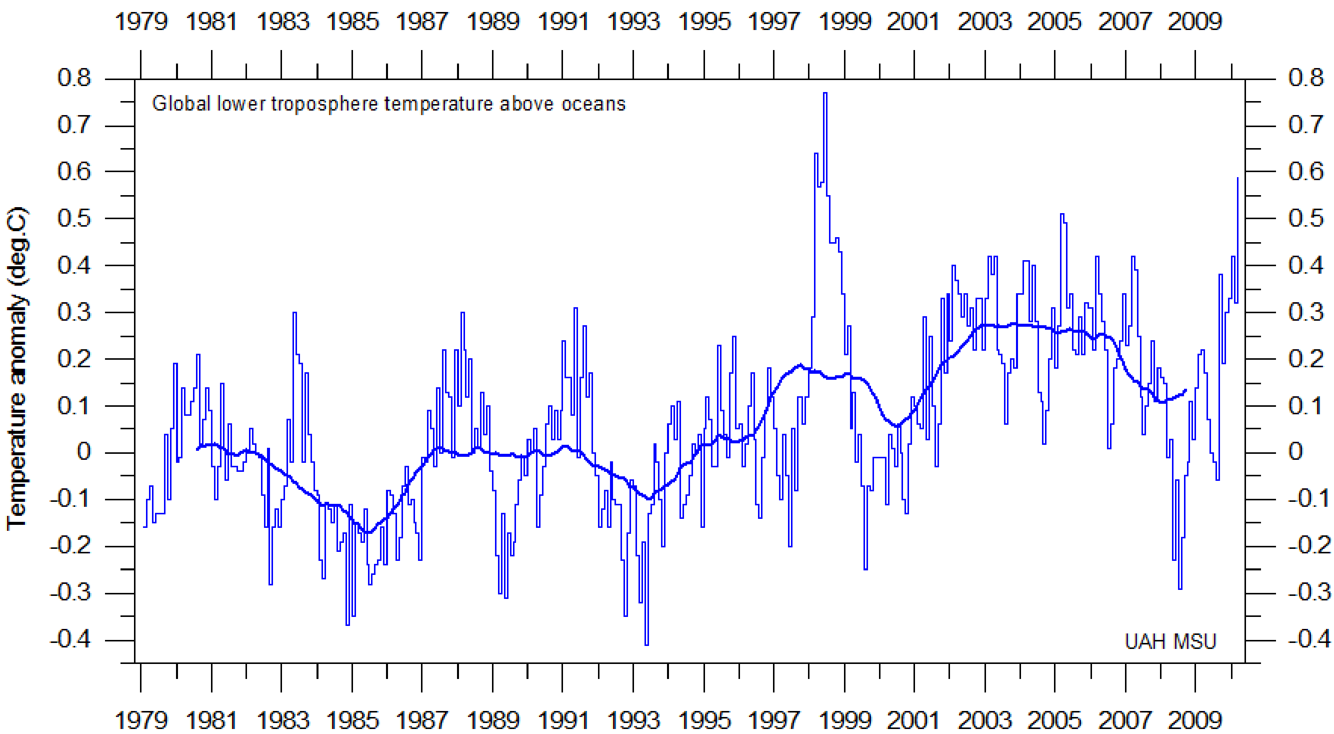
Global monthly average surface air temperature (thin line) since 1979 according to according to the [Goddard Institute for Space Studies](#) (GISS), at Columbia University, New York City, USA. The thick line is the simple running 37 month average.



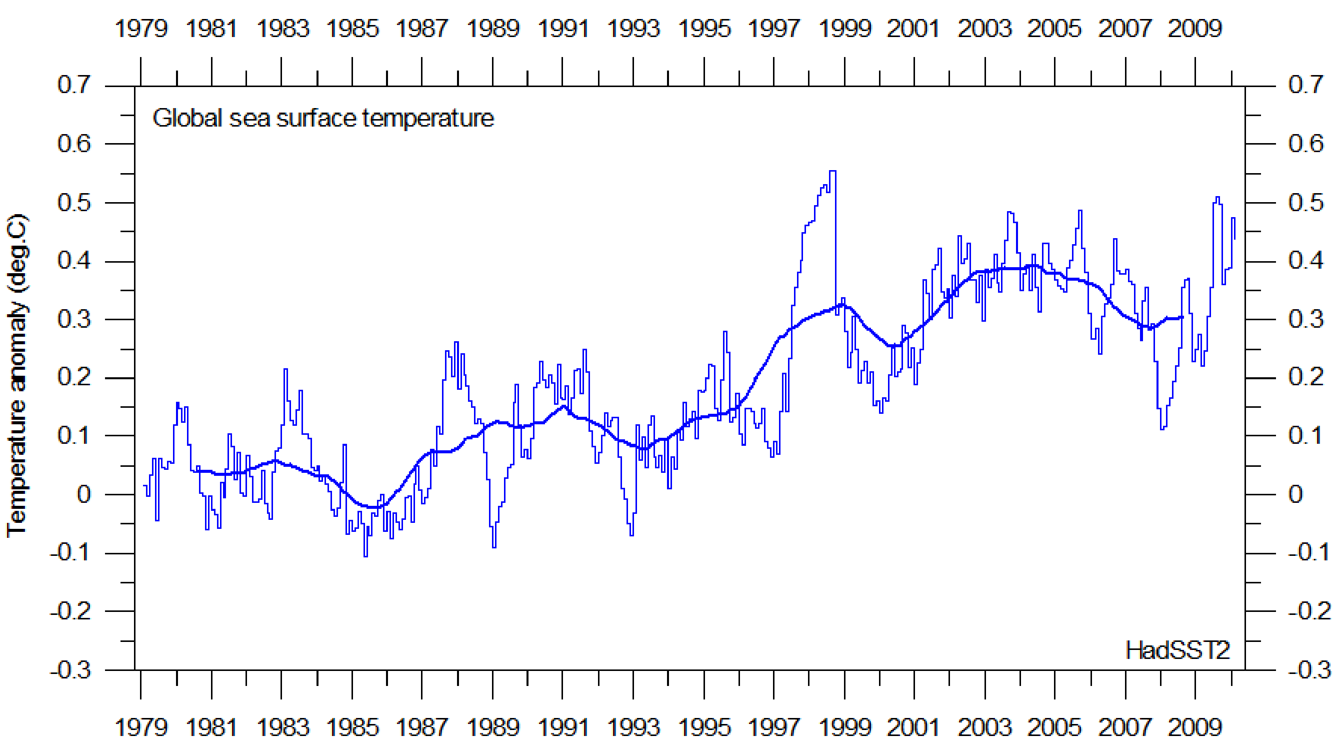
Global monthly average surface air temperature since 1979 according to according to the [National Climatic Data Center](#) (NCDC), USA. The thick line is the simple running 37 month average.

Some readers have noted that several of the above data series display changes when one compare with previous issues of this newsletter, not only for the most recent months, but for most months included in the data series. The interested reader may find more on this lack of temporal stability on [www.climate4you](#) (go to: Global Temperature and then Temporal Stability).

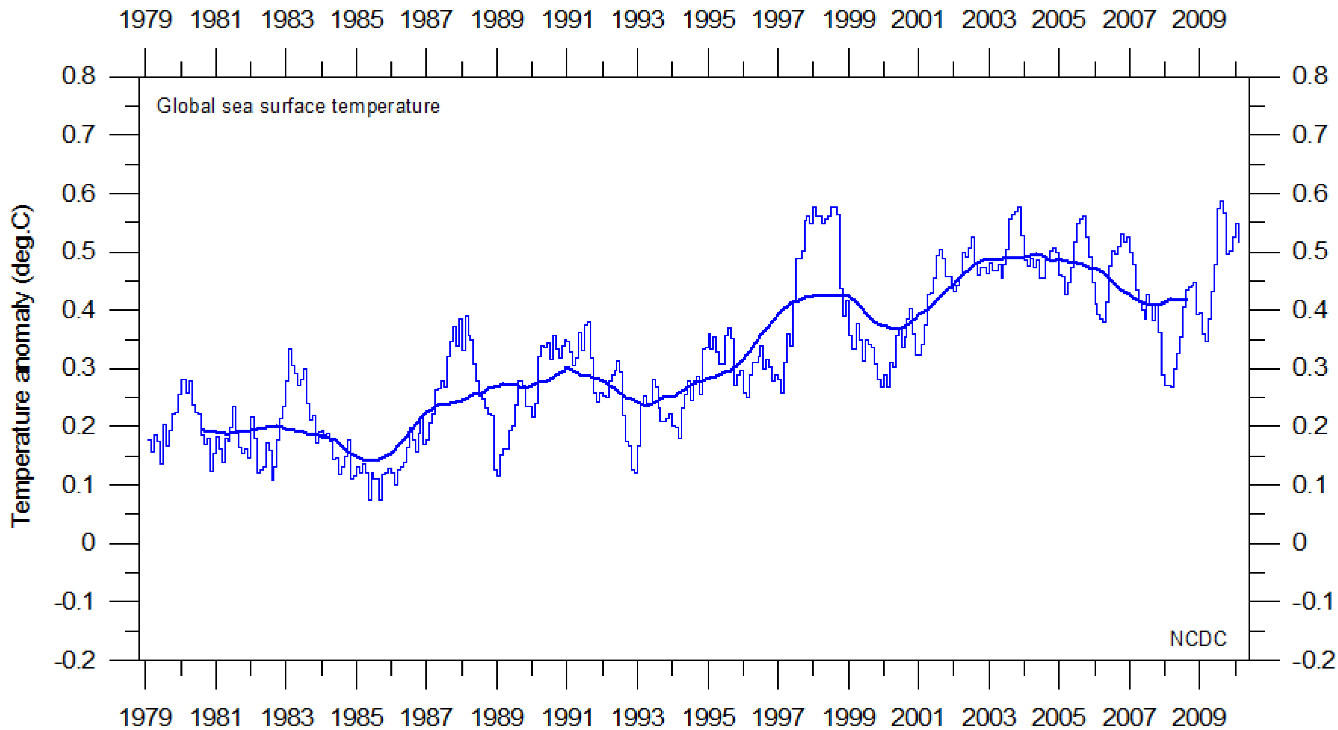
Global sea surface temperature, updated to January 2010



Global monthly average lower troposphere temperature over oceans (thin line) since 1979 according to University of Alabama at Huntsville, USA. The thick line is the simple running 37 month average.

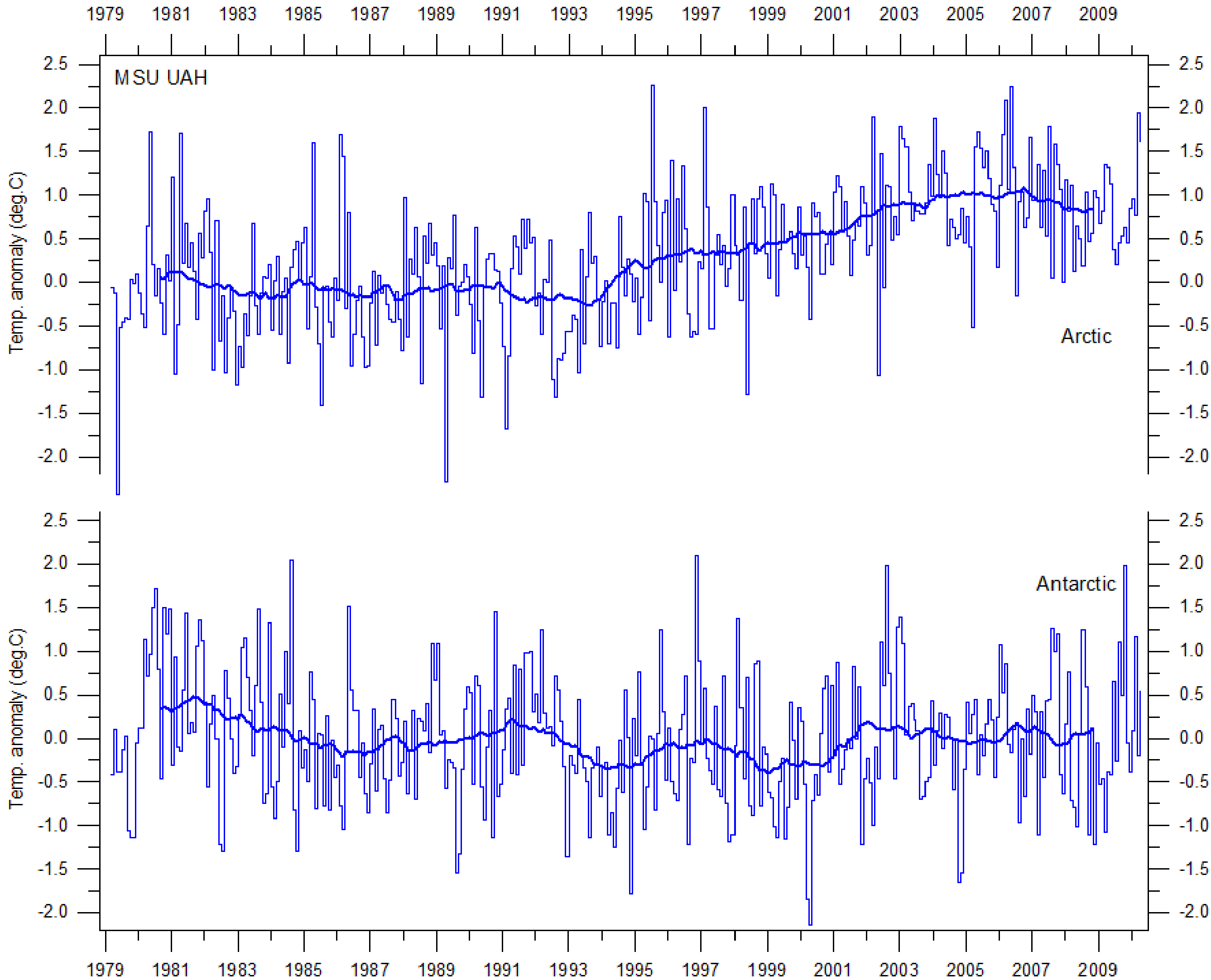


Global monthly average sea surface temperature since 1979 according to University of East Anglia's Climatic Research Unit (CRU), UK. Base period: 1961-1990. The thick line is the simple running 37 month average.



Global monthly average sea surface temperature since 1979 according to the [National Climatic Data Center](#) (NCDC), USA. Base period: 1901-2000. The thick line is the simple running 37 month average.

Arctic and Antarctic lower troposphere temperature, updated to January 2010



Global monthly average lower troposphere temperature since 1979 for the North Pole and South Pole regions, based on satellite observations (University of Alabama at Huntsville, USA). The thick line is the simple running 37 month average, nearly corresponding to a running 3 yr average.

Arctic and Antarctic surface air temperature, updated to December 2009

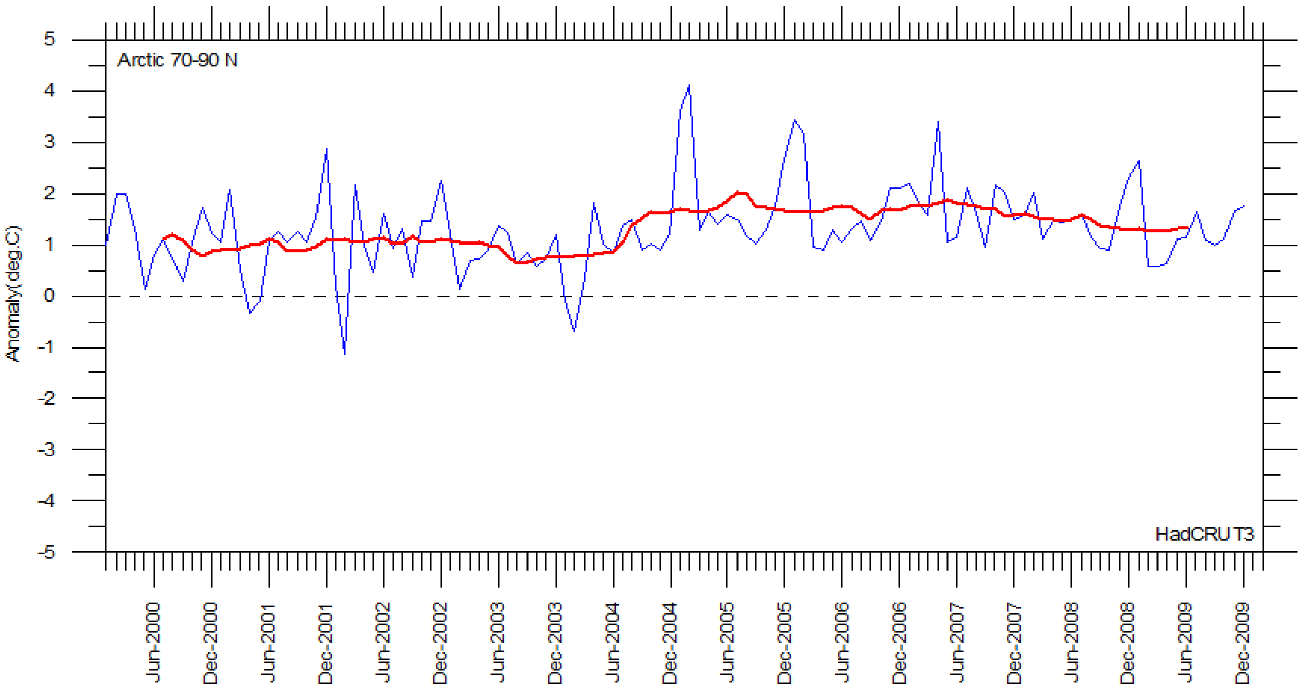


Diagram showing Arctic monthly surface air temperature anomaly 70-90^{o}N since January 2000, in relation to the WMO reference "normal" period 1961-1990. The thin blue line shows the monthly temperature anomaly, while the thicker red line shows the running 13 month average. Data provided by the Hadley Centre for Climate Prediction and Research and the University of East Anglia's [Climatic Research Unit](#) ([CRU](#)), UK. Please note that this data series has not been updated beyond December 2009.

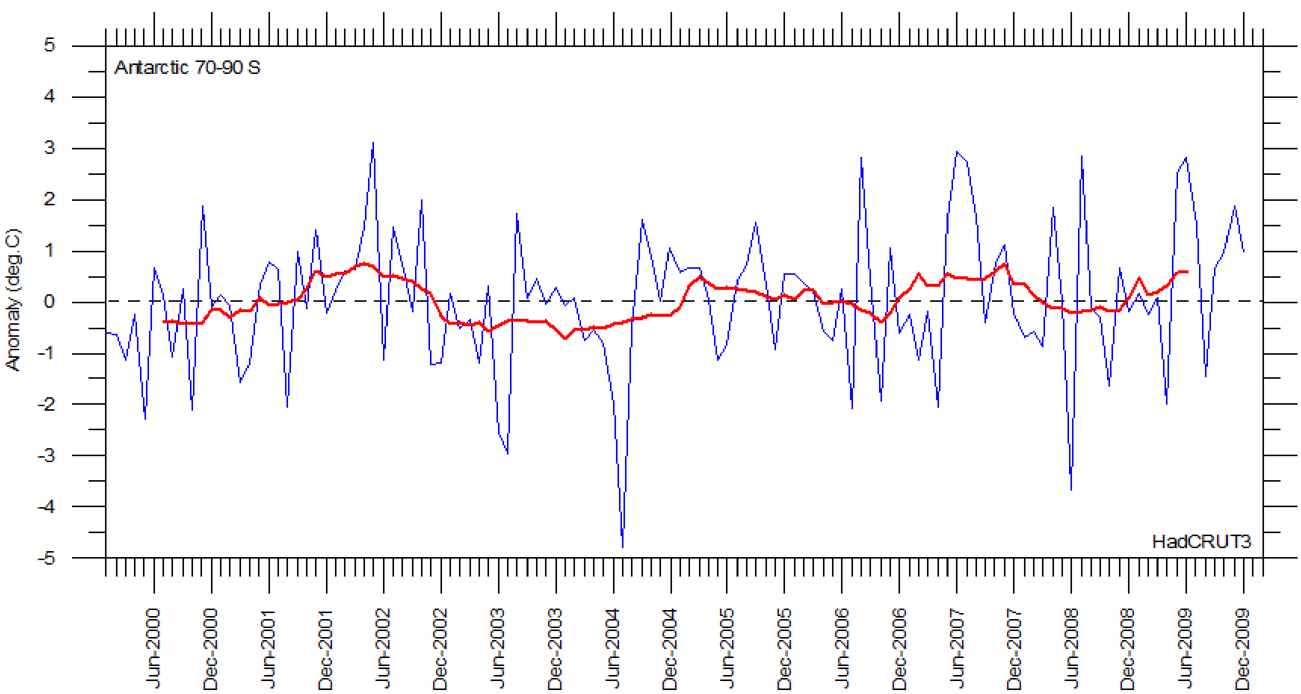


Diagram showing Antarctic monthly surface air temperature anomaly 70-90^{o}S since January 2000, in relation to the WMO reference "normal" period 1961-1990. The thin blue line shows the monthly temperature anomaly, while the thicker red line shows the running 13 month average. Data provided by the Hadley Centre for Climate Prediction and Research and the University of East Anglia's [Climatic Research Unit](#) ([CRU](#)), UK. Please note that this data series has not been updated beyond December 2009.

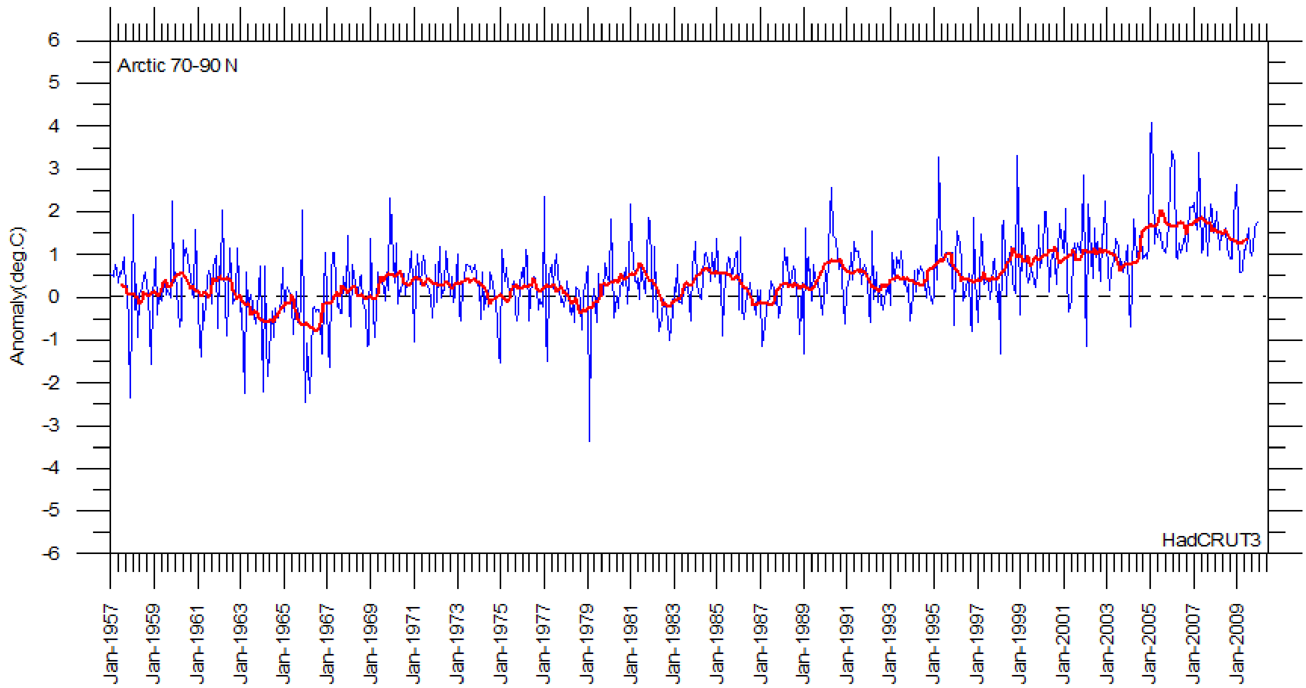


Diagram showing Arctic monthly surface air temperature anomaly 70-90°N since January 1957, in relation to the WMO reference "normal" period 1961-1990. The year 1957 has been chosen as starting year, to ensure easy comparison with the maximum length of the realistic Antarctic temperature record shown below. The thin blue line shows the monthly temperature anomaly, while the thicker red line shows the running 13 month average. Data provided by the Hadley Centre for Climate Prediction and Research and the University of East Anglia's Climatic Research Unit (CRU), UK. Please note that this data series has not been updated beyond December 2009.

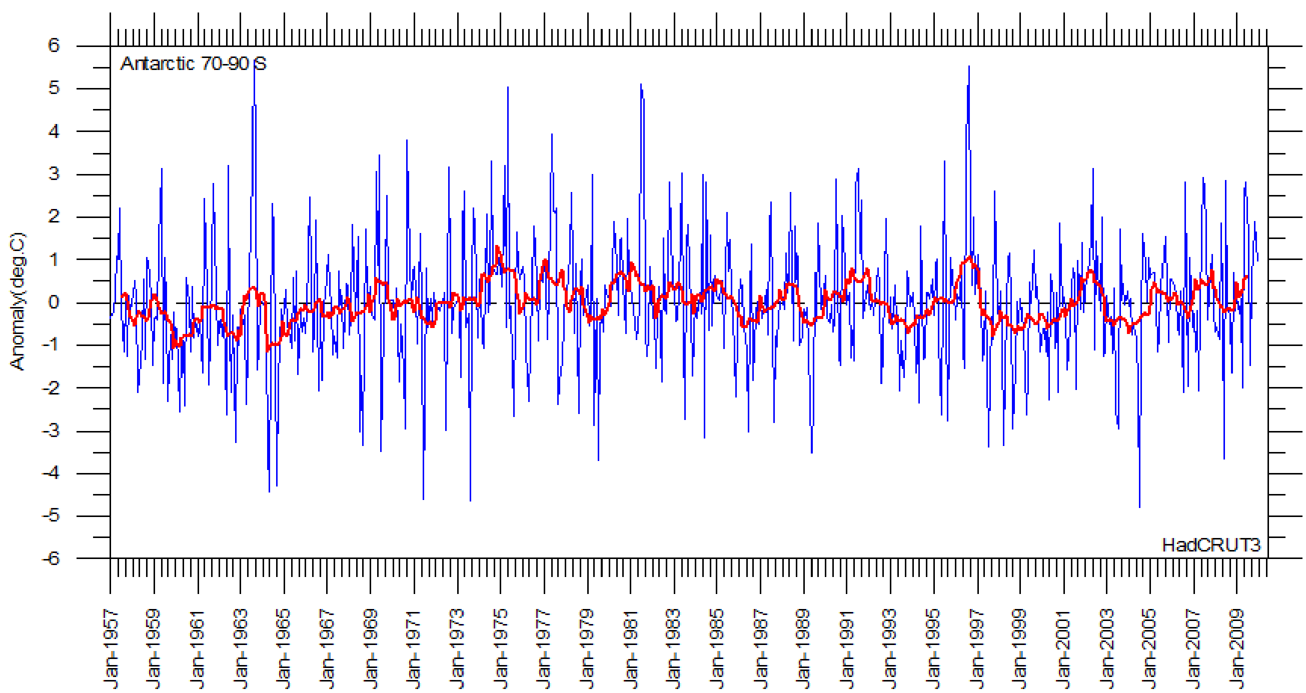


Diagram showing Antarctic monthly surface air temperature anomaly 70-90°S since January 1957, in relation to the WMO reference "normal" period 1961-1990. The year 1957 was an international geophysical year, and several meteorological stations were established in the Antarctic because of this. Before 1957, the meteorological coverage of the Antarctic continent is poor. The thin blue line shows the monthly temperature anomaly, while the thicker red line shows the running 13 month average. Data provided by the Hadley Centre for Climate Prediction and Research and the University of East Anglia's Climatic Research Unit (CRU), UK. Please note that this data series has not been updated beyond December 2009.

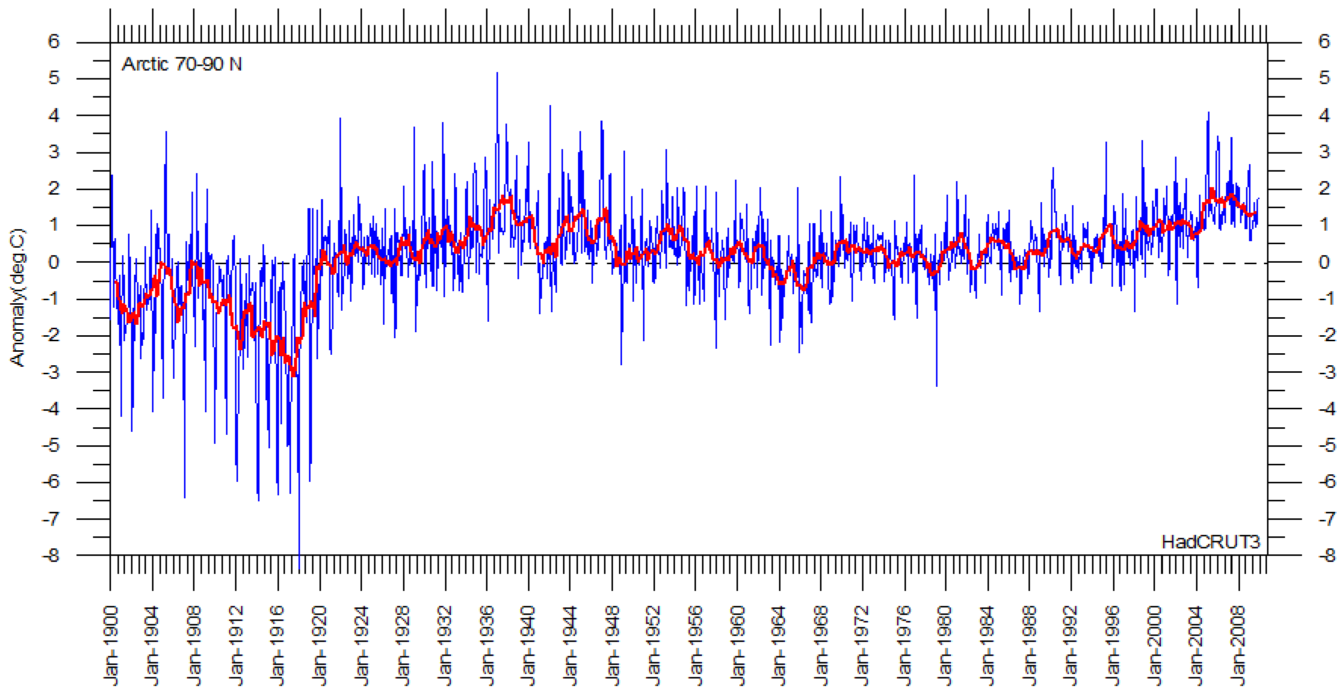
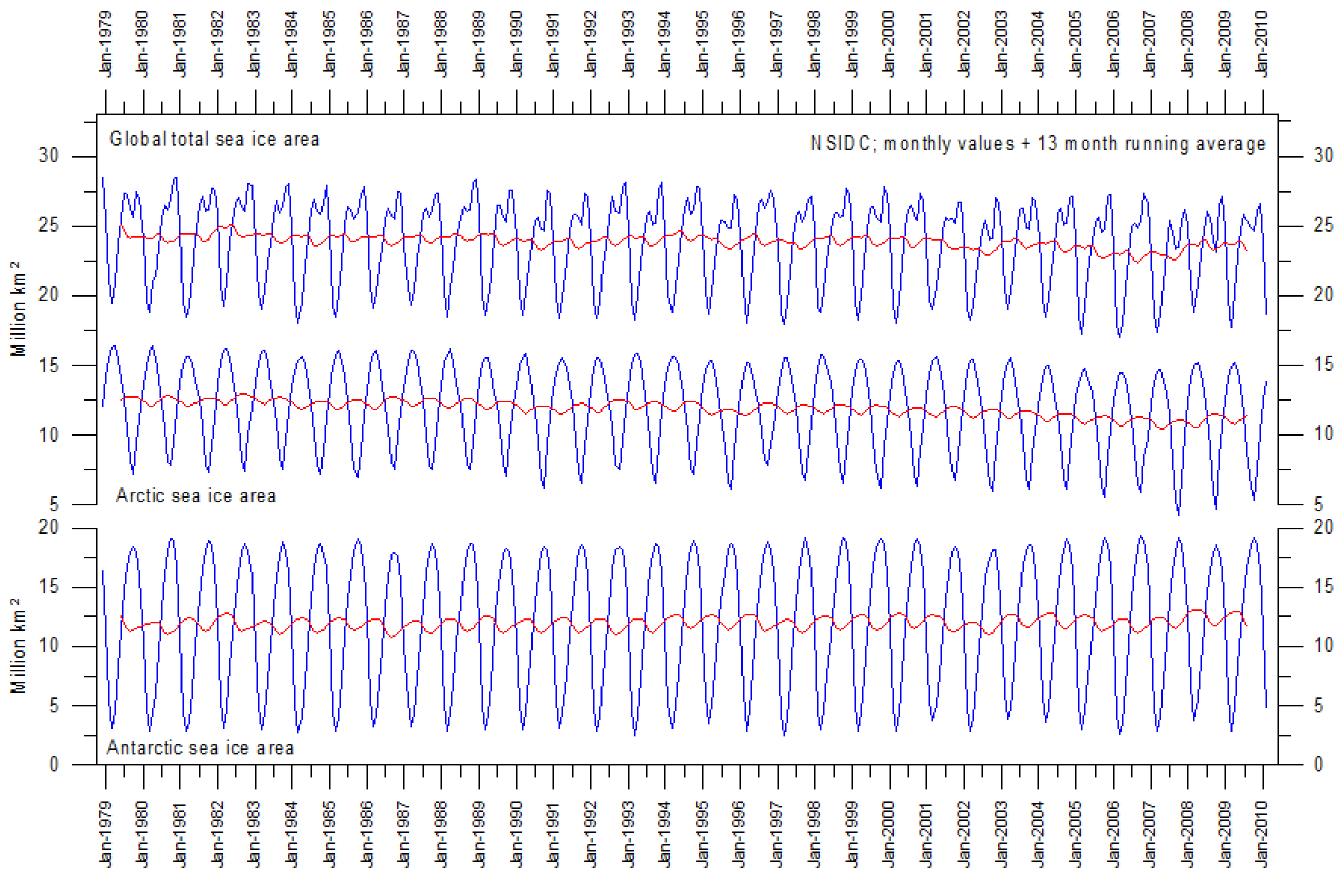


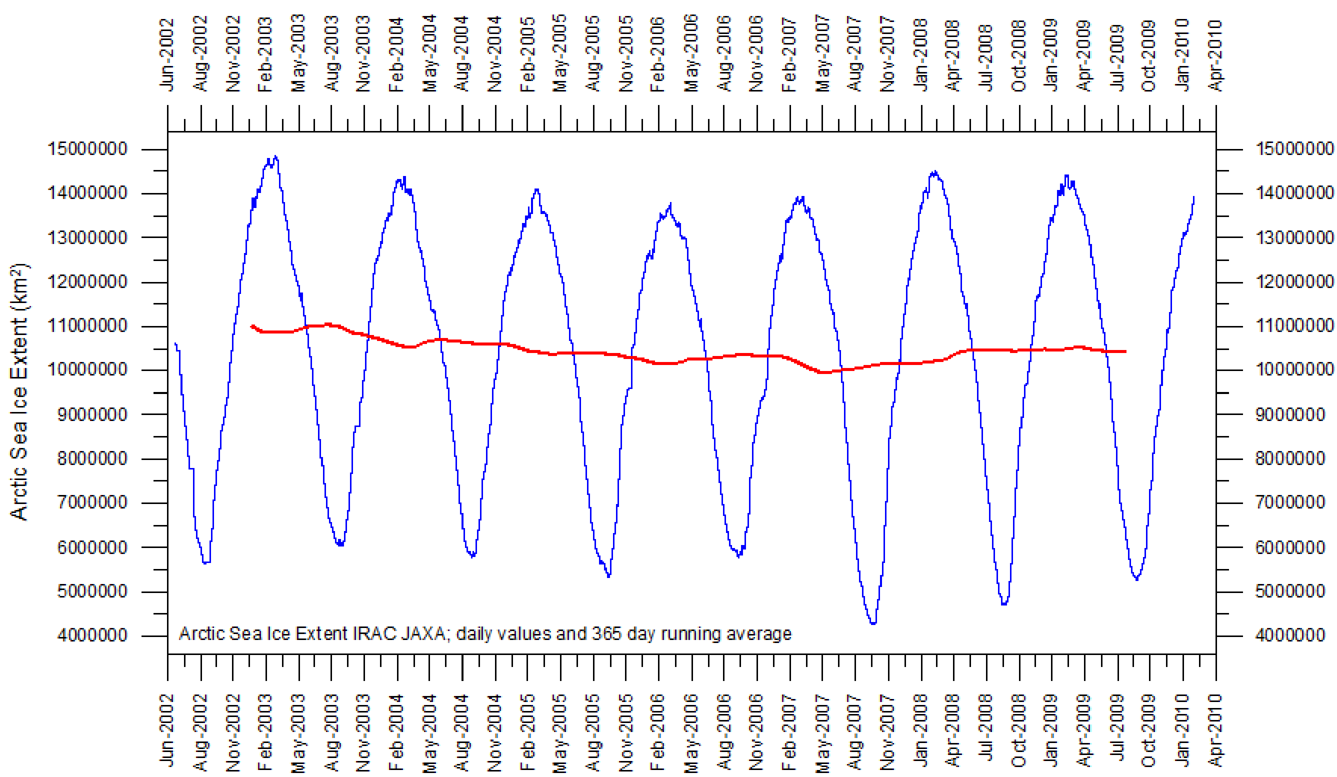
Diagram showing Arctic monthly surface air temperature anomaly 70-90°N since January 1900, in relation to the WMO reference "normal" period 1961-1990. The thin blue line shows the monthly temperature anomaly, while the thicker red line shows the running 13 month average. In general, the range of monthly temperature variations decreases throughout the first 30-50 years of the record, reflecting the increasing number of meteorological stations north of 70°N over time. Especially the period from about 1930 saw the establishment of many new Arctic meteorological stations, first in Russia and Siberia, and following the 2nd World War, also in North America. Because of the relatively small number of stations before 1930, details in the early part of the Arctic temperature record should not be over interpreted. The rapid Arctic warming around 1920 is, however, clearly visible, and is also documented by other sources of information. The period since 2000 is warm, about as warm as the period 1930-1940. Data provided by the Hadley Centre for Climate Prediction and Research and the University of East Anglia's [Climatic Research Unit](#) ([CRU](#)), UK. Please note that this data series has not been updated beyond December 2009.

In general, the Arctic temperature record appears to be less variable than the contemporary Antarctic record, presumably at least partly due to the higher number of meteorological stations north of 70°N, compared to the number of stations south of 70°S.

[Arctic and Antarctic sea ice, updated to January 2010]()

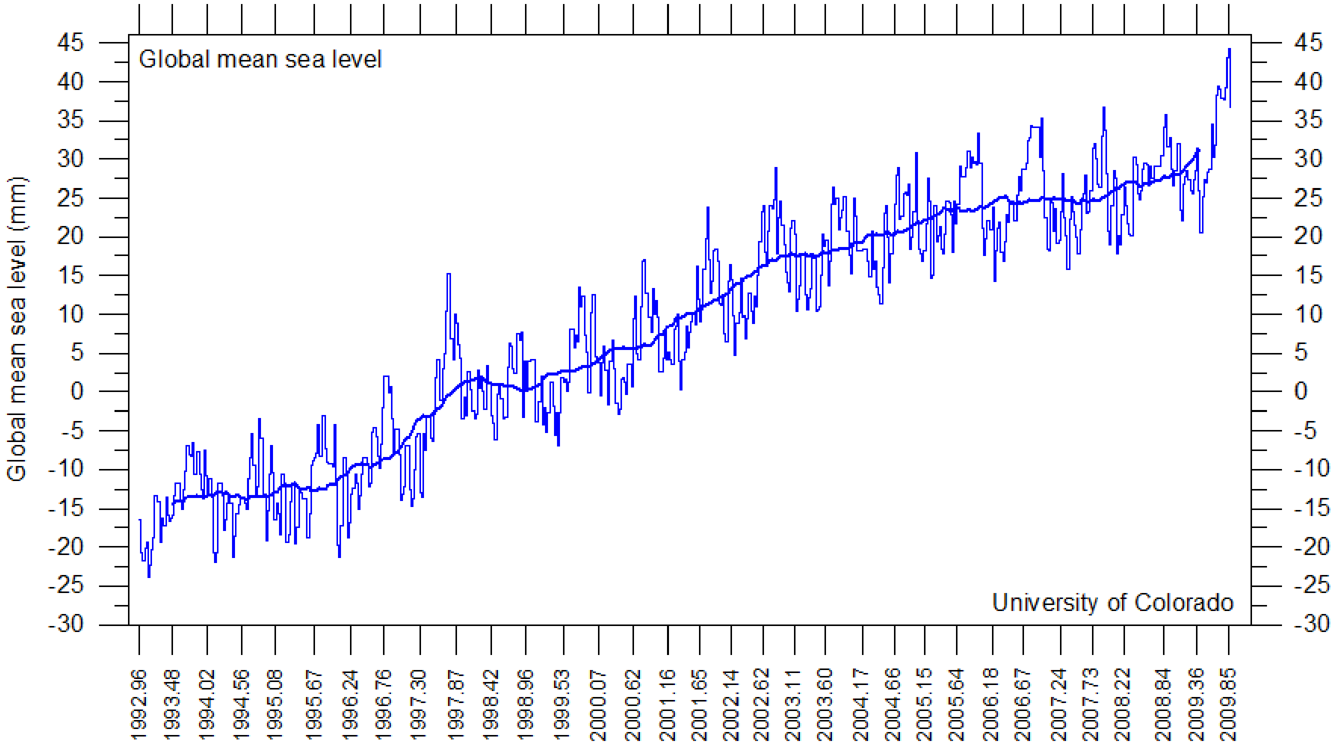


Graphs showing monthly Antarctic, Arctic and global sea ice extent since November 1978, according to the [National Snow and Ice data Center]() (NSIDC).

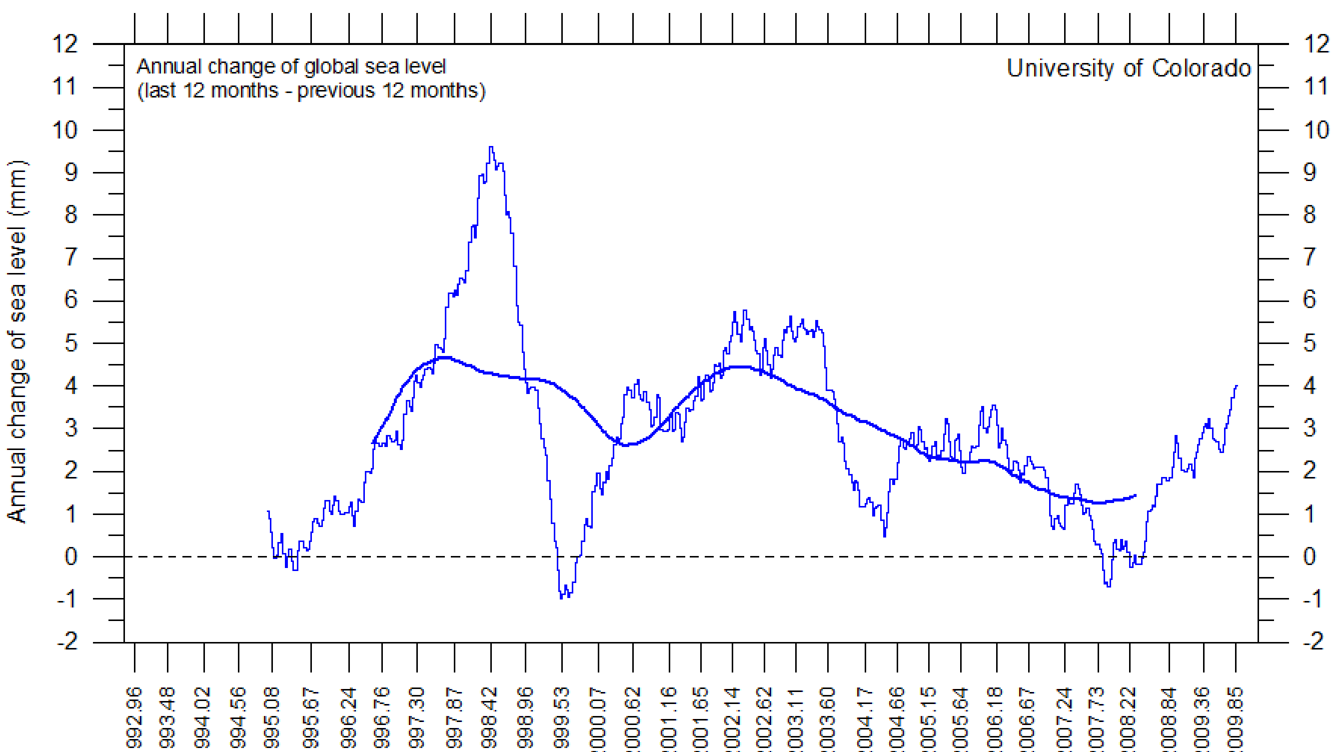


Graph showing daily Arctic sea ice extent since June 2002, to 17/02 2010, by courtesy of [Japan Aerospace Exploration Agency](#) (JAXA).

[Global sea level, updated January 2010](#)

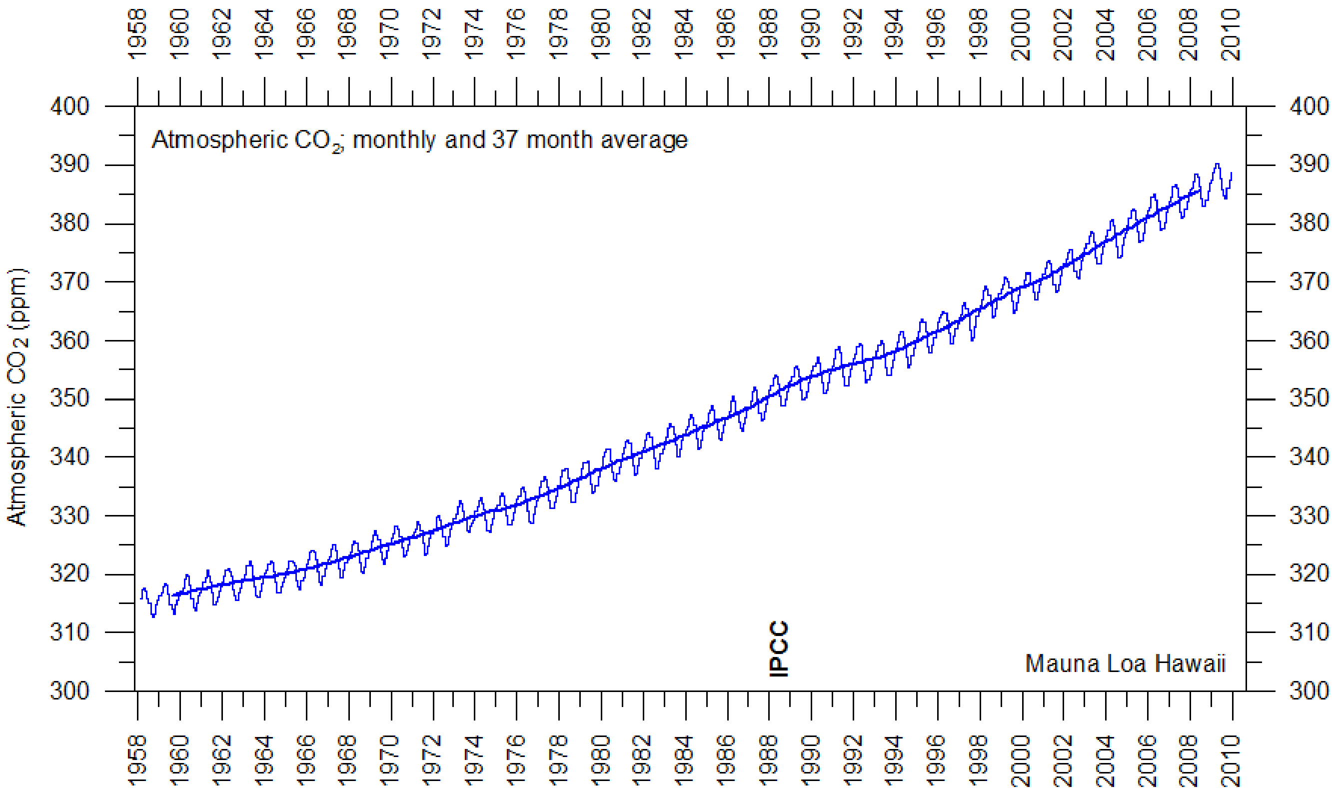


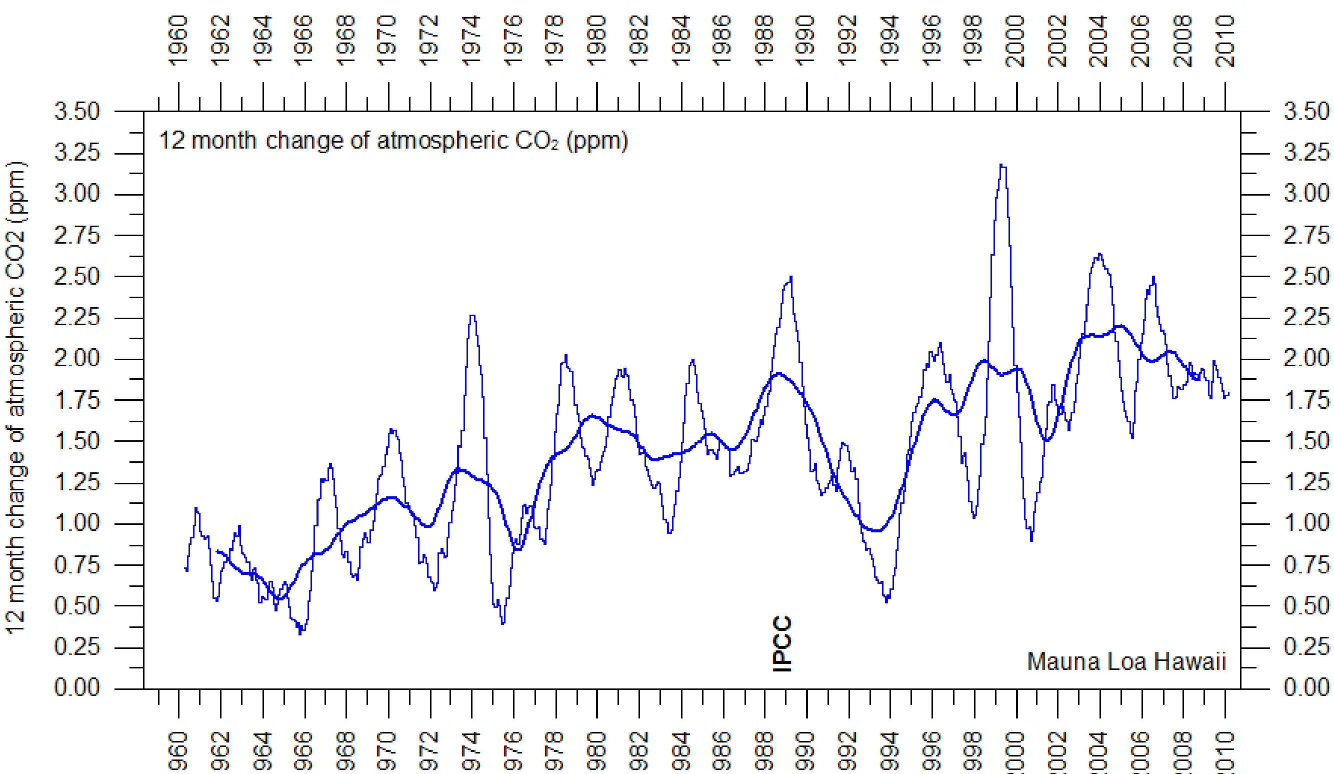
Globa lmonthly sea level since late 1992 according to the Colorado Center for Astrodynamics Research at [University of Colorado at Boulder](#), USA. The thick line is the simple running 37 observation average, nearly corresponding to a running 3 yr average.



Annual change of global sea level since late 1992 according to the Colorado Center for Astrodynamics Research at [University of Colorado at Boulder](#), USA. The thick line is the simple running 3 yr average.

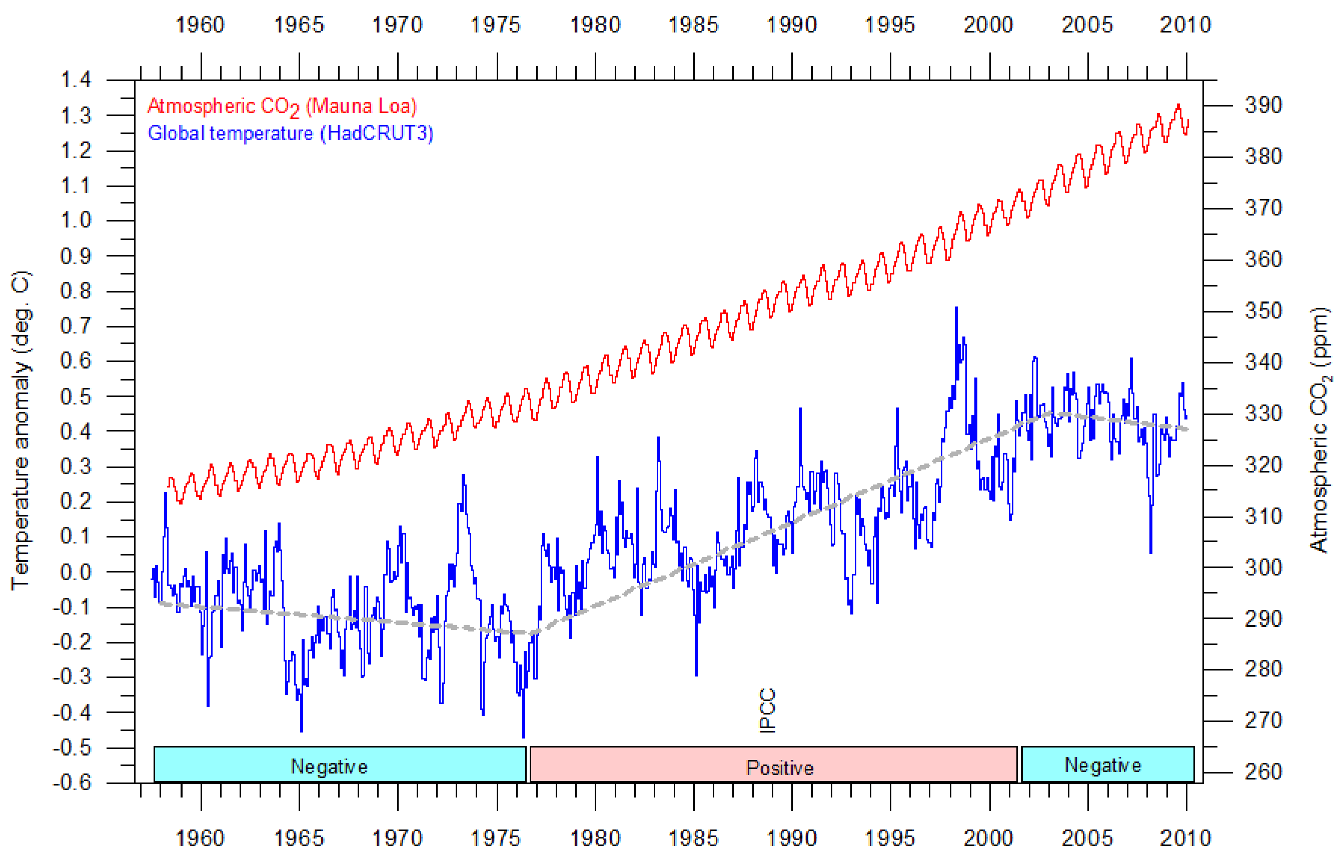
Atmospheric CO_2, updated to January 2010

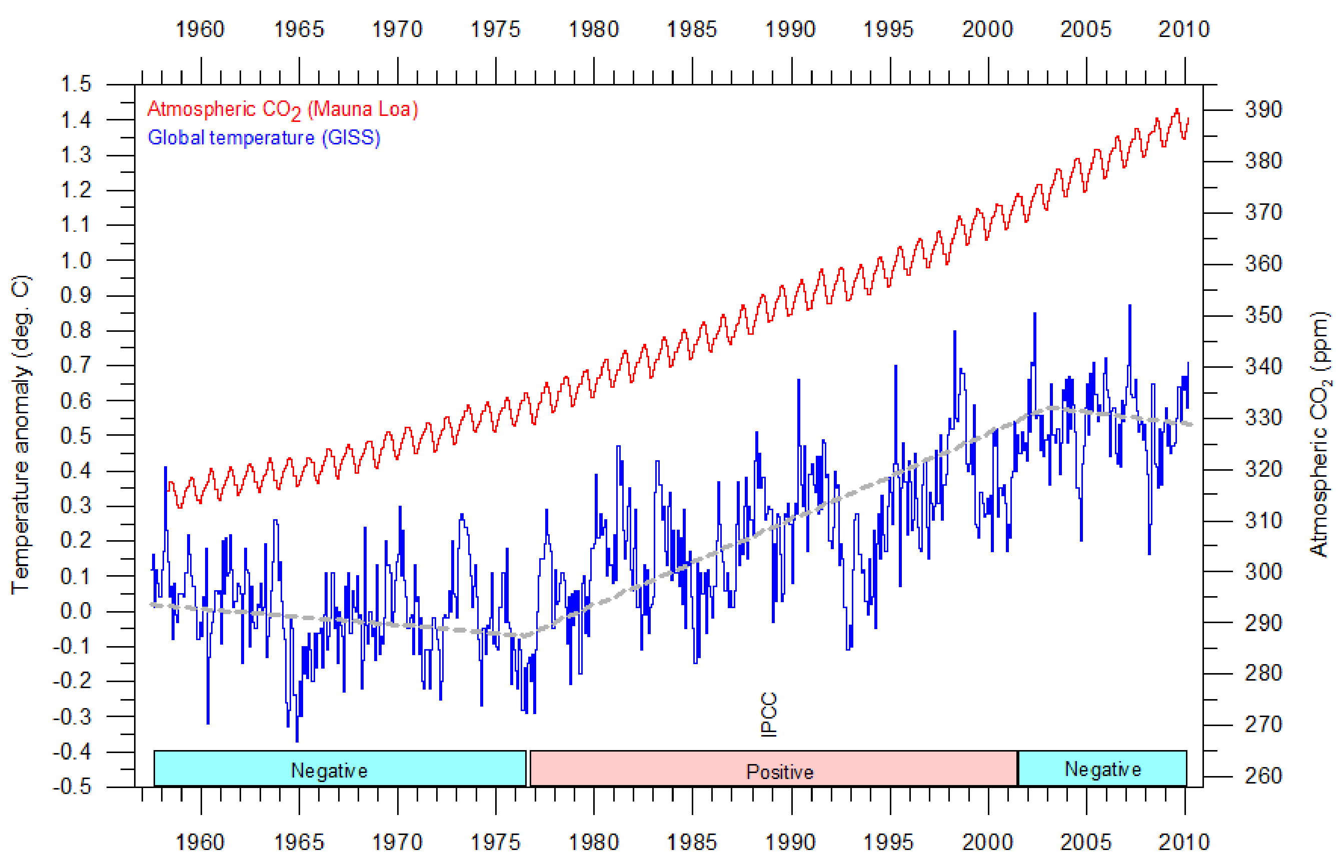


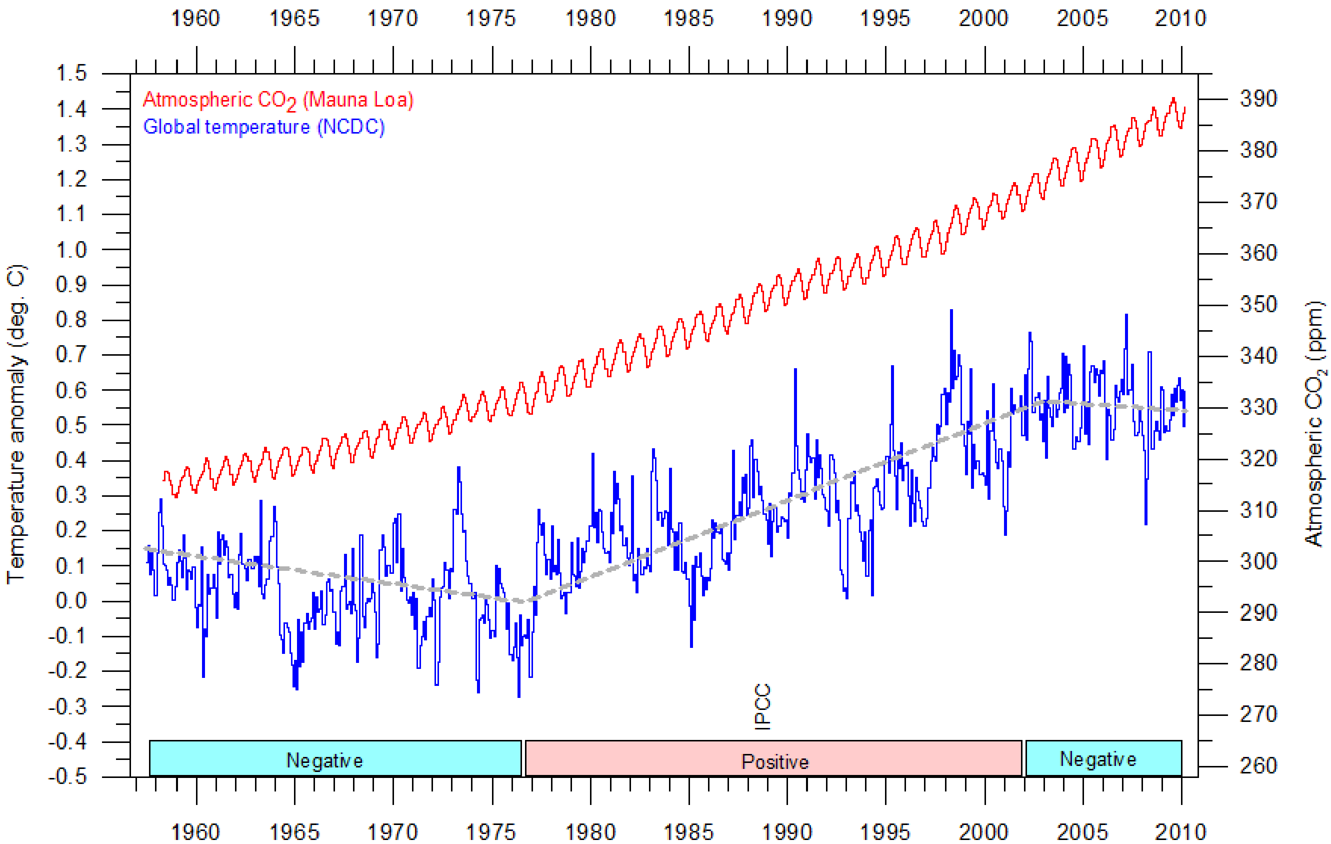


Monthly amount of atmospheric CO_2 (above) and annual growth rate (below; average last 12 months minus average preceding 12 months) of atmospheric CO_2 since 1959, according to data provided by the [Mauna Loa Observatory](), Hawaii, USA. The thick line is the simple running 37 observation average, nearly corresponding to a running 3 yr average.

Global surface air temperature and atmospheric CO_2, updated to January 2010







Diagrams showing HadCRUT3, GISS, and NCDC monthly global surface air temperature estimates (blue) and the monthly atmospheric CO_2 content (red) according to the [Mauna Loa Observatory](), Hawaii. The Mauna Loa data series begins in March 1958, and 1958 has therefore been chosen as starting year for the diagrams. Reconstructions of past atmospheric CO_2 concentrations (before 1958) are not incorporated in this diagram, as such past CO_2 values are derived by other means (ice cores, stomata, or older measurements using different methodology, and therefore are not directly comparable with modern atmospheric measurements. The dotted grey line indicates the approximate linear temperature trend, and the boxes in the lower part of the diagram indicate the relation between atmospheric CO_2 and global surface air temperature, negative or positive. Please note that the HadCRUT3 data series has not been updated beyond December 2009.

Most climate models assume the greenhouse gas carbon dioxide CO_2 to influence significantly upon global temperature. Thus, it is relevant to compare the different global temperature records with measurements of atmospheric CO_2, as shown in the diagrams above. Any comparison, however, should not be made on a monthly or annual basis, but for a longer time period, as other effects (oceanographic, clouds, etc.) may well override the potential influence of CO_2 on short time scales such as just a few years.

It is of cause equally inappropriate to present new meteorological record values, whether daily, monthly or annual, as support for the hypothesis ascribing high importance of atmospheric CO_2 for global temperatures. Any such short-period meteorological record value may well be the result of other phenomena than atmospheric CO_2.

What exactly defines the critical length of a relevant time period to consider for evaluating the alleged high importance of CO_2 remains elusive, and is still a topic for debate. The critical period length must, however, be inversely proportional to the importance of CO_2 on the global temperature, including feedback effects, such as assumed by most climate models.

After about 10 years of global temperature increase following global cooling 1940-1978, IPCC was established in 1988. Presumably, several scientists interested in climate then felt intuitively that their empirical and theoretical understanding of climate dynamics was sufficient to conclude about the importance of CO2 for global temperature. However, for obtaining public and political support for the CO_2-hyphotesis the 10 year warming period leading up to 1988 in all likelihood was important. Had the global temperature instead been decreasing, public support for the hypothesis would have been difficult to obtain. Adopting this approach as to critical time length, the varying relation (positive or negative) between global temperature and atmospheric CO_2 has been indicated in the lower panels of the three diagrams above.

Climate and history; one example among many

1362: Grote Mandrenke and the opening of the Zuiderzee in the Netherlands

Map showing the outline of the Netherlands with the developing Zuiderzee around year 100 (left) and around year 1000 (centre), according to Tramplers Geographischer Mittelschulatlas, 8th Ed., Wien. The map to the right shows the distribution of land and sea 1658 according to Janssonius Map of the Republic of the Seven United Netherlands.

The storm Grote Mandrenke (Great Drowning of Men) strikes the Netherlands in January 1362. Hurricane-force winds with enormous waves and a considerable sea level rise (a storm surge) due to the combined action of push by the wind and lifting of the sea surface because of low air pressure flooded extensive areas of the Netherlands, killing at least 25,000 inhabitants. This number should of cause be seen in relation to the much smaller population at that time than now. The storm also flooded and eroded large land areas in western Slesvig, Denmark, whereby sixty parishes is said to have disappeared totally. Also southern England was severely hit by the storm, with much damage on buildings and infrastructure.

The 1362 storm resulted in severe coastal erosion, contributing to the opening of a pre-existing topographical low in the Netherlands towards the North Sea. This process was already initiated by previous storms, and after a disastrous flood in 14 December 1287 (St. Lucia's flood) the name Zuiderzee came into general usage for this 120 km long pocket-like extension of the North Sea. The 1287 flood is presumably the fifth largest flood in recorded history, and is believed to have drowned somewhere between 50,000 and 80,000 people.

The North Sea itself is also, in geological terms, a new feature in Europe. Following the termination of the last ice age about 12,500 years ago, the present North Sea was dry land. But due to the general (eustatic) sea level rise which followed until about 5000 years ago because of the melting of the last remnants of the big ice sheets in Europe and North America, and the reduction of the ice sheets in Greenland and Antarctic, global sea level rose and the North Sea was flooded. Before the North Sea expanded to its present size, a shallow topographical depression existed where the Zuiderzee later formed. Of cause this area had poor drainage, and over time became partly filled with peat. During storms like the Grote Mandrenke this peat was easily eroded, and the North Sea extended rapidly inland to form the Zuiderzee.

Around the Zuiderzee many fishing villages grew up and several of these developed into fortified towns with important trade connections with other ports in the Baltic Sea and in England. The village Amsterdam at the southern end of Zuiderzee was one of these settlements which later developed into a major city. Later this trade with base in the Zuiderzee developed with connections to most of the world. The associated economy formed the basis for Netherlands later period of status and glory, and the trade activities were also foundation for establishing its colonial empire.

Zuiderzee (Ijselmeer since 1932) as seen from north (left), and from the southeast (right). The big dam Afsluitdijk can be seen in the centre of the picture to the left. Between this dike and the open North Sea, a complex systems of tidal channels are seen. The distance from the barrier island coastline in the foreground to the innermost part of Ijselmeer is about 120 km. Reclaimed areas, polders, are seen in the foreground of the picture to the right. The city Amsterdam is located at the southern tip of Ijselmeer (the former Zuiderzee). Source: Google Earth.

It was a severe storm with new floodings in 1916 that prompted the early 20th century construction a large enclosing dam to reclaim parts of the Zuiderzee. The construction of this dam, the Afsluitdijk, for the first time made it possible to control changes of water level in the Zuiderzee during storms. With the completion of the dam in 1932 the Zuiderzee became the inland sea Ijselmeer, and large water covered areas could be reclaimed for farming and housing by construction of surrounding dikes and pumping. These newly reclaimed areas are today known as polders.

References:

Lamb, H.H. 1991. Historical Storms of the North Sea, British Isles and Northwest Europe. Cambridge University Press, Cambridge, 204 pp.

All above diagrams with supplementary information (including links to data sources) are available on www.climate4you.com

Yours sincerely, Ole Humlum (Ole.Humlum@geo.uio.no)

18 February 2010.